

ment and floristics. Good lodgings and intriguing meals ranging from a picnic with "makings" obtained at a four corners store (which had been in business for over 100 years) to a complete Maine shore dinner kept us in trim for the long days collecting and the short evenings (nights) for pressing.

Finally a day in Acadia National Park with Maurice Sullivan, Park Naturalist, brought our tour to a close. Species have not been mentioned in this report because of the vast number that were of interest and the limitations of space. Lists from characteristic habitats and local stations of botanical significance have been previously recorded by others and are available. A possible extension of range in the discovery of *Iris setosa* at Jonesport by Dr. Jacques Rousseau of the University of Montreal is our only chance of contributing to botanical science. Daily attendance fluctuated from seventeen to fifty-eight. Total participation was seventy-five. A final word of thanks to all who guided us.

JOHN A. SMALL

PROCEEDINGS OF THE CLUB

MINUTES OF THE MEETING OF OCTOBER 15, 1941

The meeting was called to order by the First Vice-President, Dr. E. B. Matzke, at the New York Botanical Garden at 3:30 P.M. Thirty-five members and friends were present.

In the absence of the Recording Secretary the Corresponding Secretary read the minutes of the previous meeting. These were adopted with correction.

It was voted that Miss Mary Gojdics, Duchesne College, Omaha, Neb., be unanimously elected to annual membership.

The Corresponding Secretary requested the permission of the Club to have its name used in the press as being opposed to the proposed amendment to the State Constitution which would permit construction of a ski trail on Whiteface Mountain. After discussion, it was moved by Dr. Camp that this permission to use the Club's name be granted. Dr. Kolk seconded the motion and the Club so voted.

The scientific part of the program consisted of two discussions illustrated by lantern slides and living specimens. The first speaker,

Dr. John D. Dwyer, spoke on "Interesting plants of Litchfield County, Connecticut." The speaker's abstract follows:

A summer and fall survey of the flowering plants and ferns growing on a 4,000-acre tract of land in Litchfield County, Connecticut, and supervised by the State Board of Fisheries and Game, yielded approximately 600 species. Since the tract surrounds Bantam Lake and includes several ponds, opportunities for the study of aquatic vegetation were offered. Seventeen species of *Potamogeton*, including seven varieties, were collected. Numbered among these is *P. bupleuroides* Fernald, hitherto not reported for Connecticut west of Windsor Locks. Special collections and study of the complex species, *Arisaema triphyllum* were made. Kodachrome studies of exceptional and attractive plants were featured.

The second speaker, Mr. Jerome Metzner, spoke on "Observations on Local Volvocales." The speaker's abstract follows:

The three local species of *Volvox* may be distinguished from each other easily on the basis of certain differences in vegetative characteristics. *V. globator* has lobate protoplasts which are connected to each other by stout protoplasmic connections containing contractile vacuoles. *V. aureus* is about one-half the size of *V. globator*. Its protoplasts are not lobate and are connected by very delicate strands of protoplasm. *V. weismannia* is approximately the same size as *V. aureus* but lacks completely any protoplasmic connections. The oospores of *V. globator* are large and possess stout conical spines. The oospores of *V. aureus* lack spines. In *V. weismannia* there are slight spiny projections from the surface of the oospore.

Our knowledge of the life cycle of the genus *Volvox* is incomplete since fertilization has never been seen in any species. Preliminary studies made at Barnard College seem to indicate a complete lack of fertilization in *V. weismannia*. The oospores may be partenospores. Studies made on the development of the juvenile colony from the oospores in *V. weismannia* reveal the presence of protoplasmic connections in the early stages. This is possibly indicative of the ancestral condition.

The meeting was adjourned at 4:35 P.M. to enjoy the refreshments served by the members of the Garden staff.

Respectfully submitted,

JOHN W. THOMPSON, JR.
RECORDING SECRETARY

MINUTES OF THE MEETING OF NOVEMBER 3, 1941

The meeting was called to order by the President, Dr. J. S. Karling, at the American Museum of Natural History at 8:15 P.M. One hundred and eleven members and friends were present.

The minutes of the previous meeting were adopted as read.

It was voted that Dr. Flora Murray Scott, University of California, 405 Hilgard Street, West Los Angeles, Calif., be admitted by unanimous ballot to annual membership in the Club.

The scientific part of the program consisted of a talk by Dr. E. B. Matzke of Columbia University on "Autumn Coloration." The speaker's abstract follows:

When the green pigments, chlorophyll a and chlorophyll b, break down in the fall of the year, the carotene and xanthophyll, which are yellow to reddish-orange, become evident; anthoxanthins may be pale yellow. Anthocyanins are responsible for the brilliant red to violet colors of certain plants; their formation is governed by the genetic make-up of the plant, internal nutriment, light, temperature, available water, fixed nitrogen, and oxygen. The final brown is caused largely by tannins.

Through New England the sugar maple is the tree most largely responsible for the colors of autumn—varying from yellow to brilliant red. Its counterpart farther south is the scarlet oak, though other species of oak are also important. Red and purple colors are also added to the landscape by the dogwood, sour gum, sweet gum, sassafras, and white ash. The yellows are largely furnished by the hickories, tulip tree, and ginkgo. Black cherry, last of our trees to turn, takes on all colors, from purple to yellow.

Among the shrubs, purples, reds, and yellows are added by the sumachs, blueberries, barberry, and spicebush. Vines like cranberry, Virginia creeper, and Boston ivy, add their more modest bit. In the salt marshes glasswort is brilliant red. Beard grass paints the poorer hillsides tawny orange. Fruits, like those of holly, bittersweet, hawthorne, and barberry, each add their touch of red or yellow.

This display is characteristic of eastern Asia and eastern North America; in Europe, the Danube valley and parts of Switzerland are also showy, but to a less extent.

This final fanfare of color has no deep underlying biological significance.

The meeting was adjourned at 9:25 P.M.

Respectfully submitted,

JOHN W. THOMPSON, JR.
RECORDING SECRETARY

MINUTES OF THE MEETING OF NOVEMBER 19, 1941

The meeting was called to order by the First Vice-President, Dr. E. B. Matzke, at 3:35 P.M. at the New York Botanical Garden. Thirty-two members and friends were present.

In the absence of the Recording Secretary, the Corresponding Secretary read the minutes. The minutes of the previous meeting were adopted as read.

Mr. John T. Presley, Sacaton, Ariz., was elected by unanimous ballot to annual membership.

The scientific program consisted of three talks. The first speaker, Mr. Robert Hulbary, discussed "A fungus disease of Austrian pine." The speaker's abstract follows:

In blighted needles of Austrian pine collected in northern Illinois in the fall of 1938, immature stromata indicated the cause of the blight. Infected needles were wintered out-of-doors and examined periodically. The stromata remained quiescent through the winter but very early in the spring began to develop and by March 1 had emerged as strongly erumpent, loaf-shaped structures. A month and a half later, pycnidial locules were becoming differentiated, and by May 15 conidia were being produced.

The distinctive dothideaceaceous structure of the stroma distinguished the fungus from every described group. For it the new genus *Dothistroma* is proposed.

The well-marked dothideaceaceous structure of the stroma and the spore characters place the new fungus in the scolecosporous group of the Phomaceae close to *Hemidothis* Sydow. and *Septocya* Petrak.

The second speaker, Mr. John Dodd, discussed "Some reactions to grafting in *Viola*."

The third speaker, Dr. Sydney Greenfield, discussed "Chemical inhibition of photosynthesis." The speaker's abstract follows:

The rates of photosynthesis as measured by oxygen evolution in Warburg manometers were determined with *Chlorella vulgaris* cells pretreated with solutions of various inorganic compounds, and compared with control rates. Several substances, including $ZnSO_4$, $CuSO_4$, $(NH_4)_2SO_4$, H_3BO_3 , $NiSO_4$, $CoSO_4$, KCl , KI , and $HgCl_2$ were found to inhibit photosynthesis, whereas others like $MnSO_4$, KNO_3 , and $MgSO_4$ did not retard the process. Inhibition was studied at five light intensities, from a range where light was limiting to where it was in excess, in order to determine the effects of these inhibitors on the photochemical and dark reactions in photosynthesis. A comparison of control and pre-treated cell rates revealed differential inhibition. $ZnSO_4$, $NiSO_4$, and KCl were found to inhibit the dark reaction without appreciably affecting the light stage. $CuSO_4$, H_3BO_3 , and KI inhibited the dark reaction but also retarded the light reaction to a lesser extent. $(NH_4)_2SO_4$ and $CoSO_4$ caused a relatively equal inhibition of both reactions. No substance was found which inhibited the light reaction alone.

The meeting adjourned at 4:40 P.M. to enjoy the delicious refreshments provided by members of the Garden staff.

Respectfully submitted,

JOHN W. THOMPSON, JR.
RECORDING SECRETARY

MINUTES OF THE MEETING OF DECEMBER 2, 1941

The meeting was called to order by the President Dr. J. S. Karling, at the American Museum of Natural History at 8:20 P.M. Eighty-seven members and friends were present.

The minutes of the previous meeting were adopted as read.

Dr. Earl H. Newcomer, University of North Carolina, Chapel Hill, N. C., was elected by unanimous ballot to annual membership.

The deaths of Professor W. J. Himmel, University of Nebraska, annual member since 1924, and Mr. Severin Rapp, Sanford, Fla., associate member since 1941, were announced with regret.

The President announced that the 75th Anniversary Committee had selected the week of June 22, 1942, to hold the 75th Anniversary Celebration meetings.

The scientific part of the program consisted of a talk by Professor William Seifriz, of the University of Pennsylvania, on "Recent advances in the study of protoplasm." Professor Seifriz illustrated his talk with motion pictures of the protoplasm of slime molds.

The meeting was adjourned at 9:40 P.M.

Respectfully submitted,

JOHN W. THOMPSON, JR.
RECORDING SECRETARY

MINUTES OF THE MEETING OF DECEMBER 17, 1941

The meeting was called to order by the President, Dr. John S. Karling, at 3:30 P. M. at the New York Botanical Garden. Fifty-seven members and friends were present.

In the absence of the Recording Secretary, the Corresponding Secretary read the minutes of the previous meeting. The minutes were approved as read.

The following were elected by unanimous ballot to annual membership: Mr. Russel Lee Walp, Marietta College, Marietta, Ohio; Miss Doris A. Bach, 823 Park St., Kalamazoo, Mich.; Mr. Patrick Murray, St. Albert College, Middletown, N. Y.; Miss Dorothy Day, Smith College, Northampton, Mass.; Miss Margaret S. Brown, 36 Kent St., Halifax, N. S.; Mr. W. J. Nickerson, Harvard University, Cambridge, Mass.; Miss Clara S. Hires, Mistaire Laboratories, 152 Glen Ave., Millburn, N. J.; Mr. Victor M. Cutter, Cornell University, Ithaca, N. Y.; and Mr. D. G. Smith, 5 West 63rd St., New York, N. Y. To associate membership: Mr. I. E. Ehrenreich,

2944 West 28th St., Brooklyn, N. Y.; Rev. P. H. O'Neill, S.J., Fordham University, New York, N. Y.; Miss Laura Filmyer, 2916 Grand Concourse, New York, N. Y.; Miss Hope Mathewson, 82 East End Ave., New York, N. Y.; Miss Margaret Fife, 82 East End Ave., New York, N. Y.; Mr. Fred A. Buttrick, 184 Columbia Heights, Brooklyn, N. Y.; Miss Fairchild Bowler, 1075 Park Ave., New York, N. Y.

The transfer of Dr. Hettie M. Chute, New Brunswick, N. J., from annual to associate membership was approved.

The following resignations were accepted with regret: from annual membership: Dr. Alfred S. Goodale, Amherst College; Miss Ernestine Ball, Columbus, Ohio; Dr. Themistocles Acconci, Manhattan College; Mrs. D. C. Boyce, Pittsburg, Pa.; Mr. Charles W. Slack, Atlanta Ga.; Dr. Arthur W. Proetz, St. Louis, Mo.; Mr. G. M. Soxman, Dallas, Tex.; Miss Lena B. Henderson, Lynchburg, Va.; Dr. J. E. Weaver, University of Nebraska; Dr. J. W. Roberts, Beltsville, Md.; Dr. Valentine C. Baker, New York, N. Y.; Miss Abigail O'Brien, Remsen, N. Y.; and Mrs. F. L. Keays, Great Neck, N. Y.; from associate membership: Mrs. Cora Roe Smith, Branchville, N. J.; Mrs. Regina Jais, New York, N. Y.; Mr. Spencer Scott Marsh, Madison, N. J.; Dr. Myrtle L. Massey, Brooklyn, N. Y.; Miss Sarah J. Woodward, Brooklyn, N. Y.; Mr. Arthur E. Woods, East Orange, N. J.; and Miss Ethelwyn Doolittle, New York, N. Y.

Dr. Robbins moved that Dr. Barnhart be delegated to represent the Torrey Botanical Club at the celebration of the 50th Anniversary of the foundation of the Philadelphia Botanical Society in Philadelphia on Friday, December 18, 1941. The motion was seconded by Dr. Dodge and passed by the Club.

The scientific part of the program consisted of a talk and demonstration on "Vitamins and growth of plants" by Dr. W. J. Robbins of the New York Botanical Garden. The speaker's abstract follows:

It is now well established that the growth of many fungi is limited by their inability to make adequate quantities of one or more vitamins. Such fungi do not grow or grow poorly in a medium limited to pure sugars, minerals and asparagine but on the addition of various substances of natural origin or of one or more chemically pure vitamins, they develop satisfactorily. Ten species or strains of *Ceratostomella* were investigated.

The *Ceratostomellas* I used may be grown readily in media to which various natural products have been added, for example, malt agar, media containing a decoction of tree bark, and so on. However, of the ten strains or species reported here one only makes any considerable growth in a medium limited to minerals, sugar and asparagine. This is *Ceratostomella pseudotsugae*. However, the addition of vitamin B₁ and of vitamin B₆ to the medium materially increases the growth of that fungus. Biotin has no effect. *C. pseudotsugae* shows a partial deficiency primarily for vitamin B₁

and secondarily for vitamin B₆. *Ceratostomella piceaperda* grows very slowly in a medium of minerals, sugar and asparagine. The addition of biotin and vitamin B₆ markedly increases its growth. While *C. pseudotsugae* evidences partial deficiencies for B₁ and B₆, *C. piceaperda* suffers from partial deficiencies of biotin and B₆.

Ceratostomella ips isolated from *Pinus ponderosa* does not grow in the basal medium. It suffers from a biotin deficiency and on the addition of biotin to the medium grows quite satisfactorily. *C. fimbriata* and the *Ceratostomella* from London Plane have a complete B₁ deficiency. *C. ulmi* has a nearly complete B₆ deficiency. *C. pini* isolated from *Pinus echinata* and *C. pini* isolated from *Pinus ponderosa* though differing somewhat in appearance of growth are alike in having complete deficiency for both biotin and B₁. *C. montium* and *C. ips* isolated from *Pinus echinata* suffer from major deficiencies of B₁, B₆ and biotin. They grow little or not at all unless all three vitamins are present in the medium. Among these ten species or strains of *Ceratostomella* seven different types of vitamin deficiencies exist:

1. Major or complete deficiency for B₁—little affected by B₆ or biotin.
2. Major or complete deficiency for B₆—little affected by B₁ or biotin.
3. Major or complete deficiency for biotin—little affected by B₁ or B₆.
4. Partial deficiency B₁ and B₆—little affected by biotin.
5. Partial deficiency biotin and B₆—little affected by B₁.
6. Major deficiency biotin and B₁—little affected by B₆.
7. Major deficiency B₁, B₆ and biotin.

By selecting a suitable species of *Ceratostomella* it is possible by its growth or failure to grow to demonstrate the presence or absence of B₁, B₆ or biotin or substitutes therefor. In the course of these experiments it was discovered by accident that an extract of cotton batting added to a medium of minerals, sugar and asparagine permitted good growth of *Ceratostomellas* which showed deficiencies for B₁, B₆ or biotin or combinations. It seems justifiable to conclude that unbleached and unwashed cotton contains significant quantities of all three of these vitamins.

In the same way, that is by the growth of various species of *Ceratostomella*, the presence of B₁, B₆ and biotin in unpurified Difco agar also was determined.

Since cotton and Difco agar are both commonly used in laboratory procedures, it is clear that due consideration must be given to them as possible sources of vitamins. Knight and his associates working with the so-called sporogenes vitamin found that stray filaments of cotton falling in their media invalidated their bacterial experiments.

In presenting these results I have emphasized the more marked deficiencies of the *Ceratostomellas* for the three vitamins B₁, B₆ and biotin. Less marked deficiencies have been observed. For example, a species which grows little or not at all unless B₁ is added to the medium may grow somewhat more rapidly if all three vitamins are added. It is probable also that some of these organisms suffer from partial deficiencies for other vitamins or vitamin-like growth substances. I am not sure that reproduction will occur

in media supplemented with B₁, B₆ and biotin as satisfactorily as it does in media containing natural products, for example, malt agar. Some evidence for the deficiencies for unidentified growth substances is furnished by the more rapid growth in some natural media than in a basal medium containing twelve pure vitamins and twenty-one pure amino acids.

These results with *Ceratostomella* are of interest:

1. Because of the diversity of vitamin deficiencies in representatives of a single genus.
2. Because the discovery of a fungus with nearly complete vitamin B₆ deficiency suggests that it may be used for bio-assay for this vitamin. Assay methods for vitamin B₆ are at present unsatisfactory.
3. Because of the determination of the presence of significant quantities of biotin, B₆ and B₁ in cotton batting and unpurified agar.
4. Because the results show that a fungus may suffer from a complete deficiency of three vitamins, a situation which approaches more nearly the condition of the animal where many complete deficiencies exist. This emphasizes again the fundamental likeness of the basic physiological processes in all living things.

The meeting was adjourned at 4:20 P.M. and many members and guests remained to continue the discussion informally at tea provided by the Garden staff.

Respectfully submitted,

JOHN W. THOMPSON, JR.
RECORDING SECRETARY

THE FIELD COMMITTEE of the Club announced 168 botanical events in its schedules during 1941. Of these 85 were actual field trips, many of them in cooperation with one or more other botanical societies. Reports were received from 78 of these field trips. Total attendance was 1456 or an average of about 19 persons to each field trip. The high mark was the Branchville Nature Conference, attended by 97.